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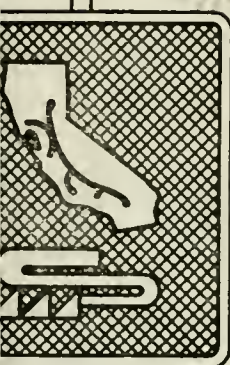
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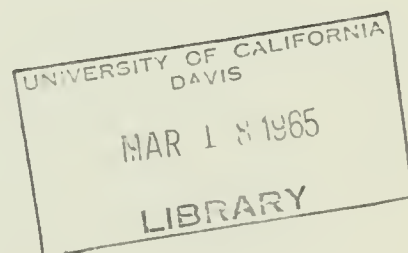
State of California  
THE RESOURCES AGENCY

Department of Water Resources

BULLETIN No. 119-25

FEASIBILITY OF SERVING  
THE EMPIRE WEST SIDE IRRIGATION DISTRICT  
FROM THE STATE WATER PROJECT

FEBRUARY 1965



HUGO FISHER  
*Administrator*  
The Resources Agency

EDMUND G. BROWN  
*Governor*  
State of California

WILLIAM E. WARNE  
*Director*  
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## FOREWORD

In November 1960, the California Water Resources Development Bond Act was approved by the State's electorate, paving the way for the construction of the State Water Project as the first phase of the California Water Plan. Since that time, many local water service agencies throughout the State have contracted with the State for water service from the proposed facilities. Several water agencies have been organized since November 1960 expressly for the purpose of obtaining water supplies from the state facilities for the areas they represent.

Prior to executing water supply contracts with water agencies, the Department of Water Resources makes studies of the agencies and the areas encompassed by them to determine the propriety of entering into such contracts. These studies are made with the goal of evaluating (1) each area's future demand for supplemental water supplies, (2) the legal ability of each agency in question to enter into a water supply contract with the State, (3) the engineering feasibility of providing the proposed water service, and (4) the financial ability of the agency to contract for a water supply from the State Water Project.

The results of the studies made for each agency, as described above, along with significant supporting material, are embodied in reports published by the Department of Water Resources. This bulletin is one of a series of such publications and describes studies which led to the signing of a contract with the Empire West Side Irrigation District on

December 30, 1963. The contract provides for the delivery of a maximum annual entitlement of 3,000 acre-feet of water from the California Aqueduct.

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1	Location of Empire West Side Irrigation District
2	Empire West Side Irrigation District
3	Water Cost-Demand Curve for Empire West Side Irrigation District

State of California  
The Resources Agency  
Department of Water Resources

EDMUND G. BROWN, Governor  
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## CHAPTER I. INTRODUCTION

A contract between the State of California, Department of Water Resources, and the Empire West Side Irrigation District for a maximum annual entitlement of 3,000 acre-feet of water from the State Water Project was signed on December 30, 1963. Presented in this report are data which demonstrate the need for and feasibility of the contract. The contract includes an option to contract for a share of the project yield uncontracted on December 31, 1963.

This chapter describes the history, economy, powers, and service area of the district. Also included is a statement concerning the water supply available to the San Joaquin Valley from the State Water Project. In the following chapters there are presented discussions of the potential water demand, the cost of water service from the State Water Project, and demand for project water as limited by cost of water. The report is concluded with an analysis of the financial feasibility of the district's purchasing water from the State.

In the course of contract negotiations with the district, there were available for consideration the Department of Water Resources' office report "Supplement to Information and Data on Proposed Program for Financing and Constructing State Water Facilities" dated May 1960; the Empire West Side Irrigation District's report on "Data Submitted in Support of Application for Approval of Pine Flat Contracts" dated October 1963; and the department's Bulletin No. 3, "The California Water Plan." These

reports provided the bases for negotiations, along with the prototype water supply contract between the State and The Metropolitan Water District of Southern California; the "Standard Provisions for Water Supply Contract" approved August 3, 1962; and Bulletin No. 132-63, "The California State Water Project in 1963."

During 1963 several meetings were held with the attorney and consulting engineer of the district. A number of studies were made and presented by the department to estimate charges which would be made by the State to the district for water under different assumptions as to maximum annual entitlement.

#### The Empire West Side Irrigation District

The Empire West Side Irrigation District was formed in July 1931 under the California Irrigation District Law. The following quotation from Bulletin No. 21C, "Report on Irrigation Districts of California" dated 1931, of the Division of Water Resources, the predecessor of the Department of Water Resources, gives a brief history of the district.

"The lands of the Empire district are a part of the Empire Ranch which contained about 18,000 acres and was acquired, subdivided and sold in small tracts by the Empire Investment Company. Prior to the sale of land to settlers, the Empire Water Company was organized and entered into an agreement with the investment company to furnish water for the Empire Ranch. This agreement was made a part of all contracts of transfer to settlers. Later the water company attempted to sell certain shares of stock it had acquired in the Lemoore Canal for supplying lands of the Empire Ranch. Injunction proceedings were instituted by landowners and the court decreed that all of the waters of the Empire Water Company were appurtenant to the lands of the Empire Ranch. Under its agreement the water company also agreed to distribute certain riparian waters, and a service charge of \$1.00 per acre per year was fixed and required whether any water was delivered or not. As a result of the company's failure to deliver water when it was available, suits for damages to the amount of \$110,000 were filed against

it by landowners. As a final settlement of the difficulties the water company, in consideration of a waiver of all claims for damages by the landowners, transferred the irrigation system and water rights to the irrigation district."

The California Irrigation District Law is contained in Division 11, Sections 20500 through 29978, of the California Water Code. The code describes district powers and duties, and prescribes the procedures for district formation, organization, management, and financing.

### Powers of the District

General Powers. The district may control, distribute, and store any water for the beneficial use of the district (Section 22075 et seq.), provide for drainage (Section 22095 et seq.), and develop and distribute electric power (Section 22115 et seq.). Portions of the territory within the district may be formed into improvement districts (Section 23600) or distribution districts (Section 23500) to bear the costs of certain works benefiting only those areas. All registered voters who are residents of the district may vote in district elections (Section 20527).

Power to Contract. The district may make any necessary contracts to carry out the purposes of the district (Section 22230). The district is also authorized to contract for any property necessary for its purposes (Section 24252), and to contract with the State for the joint acquisition, disposition or operation of any property of a kind which might be acquired by the district (Section 23100). If the largest payment to be made in any year under a contract for property exceeds one-fourth of one percent of the total assessed valuation of the land in the district

the contract is generally not valid until approved by the California Districts Securities Commission (Section 24253). The district is given specific authority to contract for water from the State Water Project by provisions of the Central Valley Project Act (see Water Code Sections 11102, 11625, 11661, and 11662).

Fiscal Powers. The district may obtain funds by water charges (Section 22280) and by ad valorem assessment of land, exclusive of improvements (Section 25500 et seq.). (Funds for payment of obligations under a contract with the United States may also be raised by assessment according to benefits (Section 23242)). Subject to varying restrictions, funds may be raised within an improvement district by water charges (Section 23800 et seq.), assessment according to benefits (Section 23626), or ad valorem assessment (Section 23750 et seq.); and within a distribution district by water charges (Section 23552) or by ad valorem assessment pursuant to Section 23533. The district may issue both general obligation and revenue bonds (Section 24950 et seq.) under the supervision of the California Districts Securities Commission (See Section 20000 et seq.; see also, e.g., Sections 24957-24961, 25241, 25403). Funds may also be raised by the issuance of short-term warrants (Section 24625 et seq.).

#### The District's Service Area

The service area of the Empire West Side Irrigation District is the entire district which is composed of 7,711 gross acres. The district is located in Kings County in the trough of the San Joaquin Valley adjacent to and west of the Kings River as shown on Plate 1, "Location of Empire West Side Irrigation



District."

The population of the district is about 100, and there has been little change in population in the past few years. There is no industry of any size in the district and no significant industrial or urban development is anticipated in the future.

The economy of the district is primarily based on irrigated agriculture. Water for the irrigated land is obtained from the Kings River and from ground water pumped from privately owned wells.

There is no land available for expansion, since all of the land in the district has been irrigated at times when sufficient water was available. A 1962 crop survey, made by the district, indicates that about 6,600 gross acres were irrigated and about 900 gross acres were dry-farmed. Most of the land was planted to barley, cotton, and field crops.

The climate of the region encompassing the district is characterized by hot dry summers, and cool winters with low annual rainfall. Although no climatological data have been published for locations in the district, the following characteristics have been estimated from U. S. Weather Bureau records for Hanford and Kettleman Station. The average annual rainfall in the district is about 8 inches. Precipitation occurs generally from November through March. In July, the hottest month, the average maximum temperature is about 99° Fahrenheit, and in January, generally the coldest month, the average minimum temperature is about 36° Fahrenheit. Ground or tule fogs are common during winter months and occasionally persist for days or weeks.

Most of the land of the district is smooth-lying, and elevations range from about 210 feet in the northern portion of the district to about 190 feet in the southern portion of the district.

Water Supply Available to San Joaquin Valley  
From State Water Project

The California Water Commission has assigned certain state applications for appropriation of water to the department for the operation of the State Water Project. The applications showed, as of December 1963, that 1,547,000 acre-feet of the water appropriated were available for use in the San Joaquin Valley.<sup>1/</sup>

As of mid-December 1963, when the water supply contract between the State and the Empire West Side Irrigation District was in the final negotiation stage, the only San Joaquin Valley contract which had been consummated was that with Kern County Water Agency for 1,000,000 acre-feet. Other San Joaquin Valley contracts under consideration totaled 214,500 acre-feet. Thus, ample water for annual entitlements was available for contracting with the district.

<sup>1/</sup> Includes 36,000 acre-feet reserved for San Joaquin Valley but not to be transferred from South Bay and Central Coastal allocations until needed, and 36,000 acre-feet transferred from North Bay and Feather River allocations to an unallocated pool held in reserve for San Joaquin Valley when and if needed and for any other area of the State if not required in the San Joaquin Valley.

In addition to annual entitlements under water supply contracts, surplus water will be available from the project. The amounts of surplus water assumed to be delivered to the district on an irrigation demand schedule are shown in column 3 of Table 6, "Financial Analysis, Empire West Side Irrigation District" (bound at the end of the report).





## CHAPTER II. POTENTIAL WATER DEMAND

Presented in this chapter are discussions of the factors affecting agricultural water demand and an estimate of the potential water demand in the Empire West Side Irrigation District based on a consideration of classification of land, unit water use, and market outlook, but disregarding the cost and availability of water. The latter are considered in Chapters III and IV.

Presented first are land classification data, estimates of unit water requirements, and a discussion of market outlook. These are followed by a determination of the potential requirement for water and an analysis of the present water supply conditions. The chapter is concluded with a determination of the potential requirement for imported water calculated as the difference between the potential water requirement and the present water supply.

As stated in Chapter I, it is not anticipated that significant urban development will occur in the district. Therefore, the entire potential demand determined herein is for agricultural use.

### Agricultural Water Demand Factors<sup>1/</sup>

#### Classification of Land

A land classification survey was conducted by the Department of Water Resources in the San Joaquin Valley during

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<sup>1/</sup> For additional information concerning these factors, see "Appendix to Final Report, General Evaluation of the Proposed Program for Financing and Constructing the State Water Resources Development System of the State of California, Department of Water Resources," October 1960, by Charles T. Main, Inc.

the period 1956-61. Table 1, "Classification of Irrigable Land in Empire West Side Irrigation District," is based on data obtained from that survey.

TABLE 1  
CLASSIFICATION OF IRRIGABLE LAND  
IN EMPIRE WEST SIDE IRRIGATION DISTRICT  
(In gross acres)

Valley Land of Excellent Quality <sup>1/</sup>	:	Valley Land of Medium Quality <sup>2/</sup>	:	Valley Land of Poor Quality <sup>3/</sup>	:	Total
1,678		4,998		1,035		7,711

<sup>1/</sup> Land classified as V and Vs.

<sup>2/</sup> Land classified as Vl, Vps, Vhs, and Vss.

<sup>3/</sup> Land classified as Vpss, Vsa, Vpsa, Vhss, and Vhsa.

Note: For definitions of land classification symbols see Department of Water Resources' "Report on Proposed Belridge Water Storage District, Kern County," December 1961.

#### Unit Use of Applied Agricultural Water

Estimated values of unit use of applied water for crops projected in the Empire West Side Irrigation District are tabulated in Table 2, "Unit Use Values of Applied Water for Crops Projected in Empire West Side Irrigation District."

TABLE 2

UNIT USE VALUES OF APPLIED WATER FOR CROPS  
PROJECTED IN EMPIRE WEST SIDE IRRIGATION DISTRICT

Crop	:Acre-feet of Water : per Acre of : Irrigated Land
Alfalfa, seed	3.2
Barley	1.1
Cotton	3.8
Miscellaneous field	2.0
Pasture	3.9
Sugar beets	2.7

### Market Outlook

In an office study prepared in 1958 entitled "Market Outlook for Selected California Crops, 1960-2020," the department estimated future demand for specialty farm products grown in California. That study was used as a guide, together with other criteria, in estimating the district's share of the total California 1990 market for specialty farm crops. This determination took into consideration historical shifts in the production of crops among different producing areas in California. The historical regional crop production shifts for the past 40 years were plotted and projected to the year 1990.

### Tentative Crop Pattern

From the market outlook study for specialty crops and estimated 1990 crop yields, the acreage necessary to supply the market demand for specialty crops in the district was determined. A tentative crop pattern was prepared for this acreage and for the remaining acreage of the district on which nonspecialty crops

would be grown.

The 1990 projected crop pattern of the district is shown in Table 3, "Tentative Crop Pattern in Empire West Side Irrigation District in 1990 Based on Consideration of Land Classification and Market Outlook." The acreage shown therein is the net acreage in the district after making reductions in the gross areas reported in the land classification table for portions of the irrigable land that would be occupied by farm lots, highways, canals, etc.

TABLE 3  
TENTATIVE CROP PATTERN IN EMPIRE WEST SIDE  
IRRIGATION DISTRICT IN 1990 BASED ON  
CONSIDERATION OF LAND CLASSIFICATION AND MARKET OUTLOOK

Crop	:	Net Acres
Alfalfa, seed	:	530
Barley	:	2,470
Cotton	:	2,120
Miscellaneous field	:	340
Pasture	:	680
Sugar beets	:	<u>680</u>
Total	:	6,820

Potential Water Requirement

There is a potential water requirement of about 17,700 acre-feet annually in the Empire West Side Irrigation District.

This amount is the sum of the products of the crop acreages in Table 3 and the appropriate unit use values of applied water in Table 2. The determination of this quantity is based on consideration of the previously described agricultural water demand factors, but disregards the economic factor of water cost and the availability of water. The effect of water cost on demand for water is considered in Chapter IV.

### Present Water Supply

#### Surface Water Supply

The district receives an average supply of water from the Kings River of about 5,500 acre-feet per year.

#### Ground Water Conditions

The district does not own wells, but there are about ten privately owned wells used in the district. An average of about 7,300 acre-feet per year is pumped from these wells. Since storage became available in Pine Flat Reservoir in 1954, the use of ground water has significantly decreased due to a more favorable rate of delivery of Kings River water. Significant amounts of new imported water are currently being supplied to nearby overdrawn areas, and the use of this water partially in lieu of ground water tends to improve ground water conditions in the district. Additional similar benefits are anticipated from the San Luis Unit of the Central Valley Project and the State Water Project. In view of these conditions, it is anticipated that the present average yield of ground water in the district will remain dependable over the repayment period.

### Safe Yield of Present Water Supplies

The total safe yield of the existing local surface and ground water supplies available to the Empire West Side Irrigation District, as described above, is estimated to be 12,800 acre-feet annually. This estimate is based on the average annual supplies and is that amount which could be consumed annually for an indefinite period of years.

### Potential Requirement for Imported Water

By deducting the estimated safe yield of the present water supply from the previously determined potential water requirement, the potential requirement for imported water in the district is determined to be 4,900 acre-feet annually.



### CHAPTER III. COST OF WATER SERVICE FROM THE STATE WATER PROJECT

The cost to the Empire West Side Irrigation District for water service from the State Water Project is dependent upon the allocation to the district of its share of the costs of the project facilities for conservation and transportation plus the cost of local conveyance facilities for distribution of water. The State Water Project will be constructed by the State primarily with funds provided under terms of the California Water Resources Development Bond Act.<sup>1/</sup> The local conveyance facility and distribution system will be provided by the district.

Allocation of project costs is governed by the contract executed on November 4, 1960, between the State and The Metropolitan Water District of Southern California. This contract is the department's prototype water supply contract. The department's publication "Standard Provisions for Water Supply Contract" approved August 3, 1962, is based on the prototype contract.

The standard provisions set forth the terms which will be generally applicable to all contracts, and establish the mutual obligations of the State and the water supply contractors. The State's essential obligation is to make available for delivery to the contracting agency, at its delivery structures, designated amounts of project water each year, commencing with the year of initial water delivery and continuing through the life of the

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<sup>1/</sup> Chapter 8 (commencing with Section 12930) of Part 6 of Division 6 of the Water Code.

contract. The essential obligation of the contracting agency is to make all payments required under the contract.

#### Cost of State Water

Under terms of the department's water supply contracts, each contracting agency will be charged for such quantities of project water as it is entitled to receive each year. In addition, charges will be made for surplus water which will be available to each agency under certain conditions.

#### Cost of Entitlement Water

Charges under the contracts are made to secure payment of reimbursable costs of the project conservation works and project transportation facilities necessary to deliver water. Charges for these purposes are called, respectively, the Delta Water Charge and the Transportation Charge.

Delta Water Charge. Every contractor for project water will pay the Delta Water Charge as an annual charge per acre-foot of project water included within its annual entitlement for the respective year. This charge, together with revenues derived from power generated in connection with the operation of project conservation facilities, will return to the State all reimbursable costs of the conservation facilities over the project repayment period.

The Delta Water Charge is established at a rate of \$3.50 per acre-foot through the year 1969 and is estimated to be \$5.46 per acre-foot for the period 1970 through 1977, and \$7.34 per acre-foot thereafter until supplemental conservation facilities, as defined in the standard provisions, are constructed. Estimated



TABLE 4

SUMMARY OF ANNUAL CHARGES TO EMPIRE WEST  
SIDE IRRIGATION DISTRICT FOR WATER FROM THE  
STATE WATER PROJECT  
(In dollars unless otherwise noted)

Calendar Year	ANNUAL ENTITLEMENTS : (In acre-feet)	ALLOCATED TRANSPORTATION CAPITAL COSTS	TRANSPORTATION CHARGE				DELTA WATER CHARGE	TOTAL WATER CHARGES
			Capital Cost	Minimum OMP & R Component	Variable OMP & R Component	Total Transportation Charge		
1964	0	51,900	0	0	0	0	0	0
1965	0	52,800	0	0	0	0	0	0
1966	0	57,300	0	0	0	0	0	0
1967	0	43,800	0	300	0	300	0	300
1968	3,000	5,600	9,900	1,200	17,400	28,500	10,500	39,000
1969	3,000	900	9,900	1,500	14,700	26,100	10,500	36,600
1970	3,000	0	9,900	1,800	13,200	24,900	16,500	41,400
1971	3,000	2,700	9,900	1,800	11,100	22,800	16,500	39,300
1972	3,000	0	9,900	2,100	11,400	23,400	16,500	39,900
1973	3,000	0	9,900	2,100	11,100	23,100	16,500	39,600
1974	3,000	0	9,900	2,100	11,100	23,100	16,500	39,600
1975	3,000	2,700	9,900	2,100	11,100	23,100	16,500	39,600
1976	3,000	0	9,900	2,100	11,700	23,700	16,500	40,200
1977	3,000	0	9,900	2,100	11,700	23,700	16,500	40,200
1978	3,000	2,700	9,900	2,100	12,000	24,000	21,900	45,900
1979	3,000	0	9,900	2,100	12,000	24,000	21,900	45,900
1980	3,000	0	9,900	2,400	12,300	24,600	21,900	46,500
1981	3,000	0	9,900	2,400	12,300	24,600	21,900	46,500
1982	3,000	0	9,900	2,400	12,600	24,900	21,900	46,800
1983	3,000	0	9,900	2,400	12,600	24,900	21,900	46,800
1984	3,000	0	9,900	2,400	12,600	24,900	21,900	46,800
1985	3,000	900	9,900	2,400	12,600	24,900	21,900	46,800
1986	3,000	0	9,900	2,100	10,800	22,800	21,900	44,700
1987	3,000	0	9,900	2,100	10,800	22,800	21,900	44,700
1988	3,000	0	9,900	2,100	10,500	22,500	21,900	44,400
1989	3,000	0	9,900	2,100	10,500	22,500	21,900	44,400
1990-2035	3,000	0	9,900	2,100	10,200	22,200	21,900	44,100
TOTALS	204,000	222,300	673,200	142,800	735,300	1,551,300	1,423,200	2,974,500
EQUIVALENT UNIT RATES (In dollars per acre-foot)			3.31	0.68	3.83	7.82	6.50	14.32

charges for this component for the demand buildup included in the contract with the district are included in Table 4, "Summary of Annual Charges to Empire West Side Irrigation District for Water from the State Water Project."

Transportation Charge. In addition to the Delta Water Charge, contractors receiving water from the State Water Project will pay for the construction and operation of the transportation facilities. Articles 23 through 28 of the standard provisions govern the determination of the transportation charge.

The allocation to each contractor of costs comprising three components of the transportation charge is made on a proportionate-use-of-facilities basis. The capital cost and the minimum or fixed operation, maintenance, power, and replacement costs are allocated on the basis of the maximum annual entitlement and peaking capacity provided for the contractor within each reach of the aqueduct which would be used to convey water to the contractor. The variable operation, maintenance, power, and replacement costs are allocated on the basis of the contractor's share of water delivered through each reach of the aqueduct during each year.

The project transportation facility that would be used to provide water to the Empire West Side Irrigation District is the portion of the California Aqueduct from the Sacramento-San Joaquin Delta to the vicinity of Huron. The elevation of the water surface in the California Aqueduct is approximately 318 feet at the district's turnout.

The total transportation capital cost allocated to the district is estimated to be \$222,300 for a maximum annual entitlement of 3,000 acre-feet at a maximum monthly peaking rate of 18 percent.

Under Article 24(c) of the standard provisions, the construction or capital cost component of the transportation charge allocated each year to a contractor must be paid in 50 equal annual payments of principal and interest. Article 45 of the prototype contract, however, permits modification of such payment method within certain limitations. Payment at a unit rate per acre-foot of water delivered which will repay all costs with interest during the project repayment period is such a permissible modification and is the method of payment assumed herein. The unit rate is estimated to be \$3.31 per acre-foot for the annual entitlements set forth in the district's contract. Payment at this rate commencing in the initial year of water delivery will repay all principal, together with interest at the project interest rate compounded annually, of the estimated project transportation capital costs allocated to the district within the project repayment period.

Annual values for the Delta Water Charge and the components of the Transportation Charge for deliveries to the district are shown in Table 4.

The determination of charges under the contract, as described above and as summarized in Table 4, does not result in a uniform charge per acre-foot of entitlement water throughout the repayment period. Since major portions of the total charge

are on a unit rate basis, however, the total charge is fairly uniform. Equivalent unit rates of components of the total charge have been computed for the purposes of comparison. These are shown in Table 4. The equivalent unit rate is defined as that constant charge which when assessed against each acre-foot of delivery during the entire repayment period will produce an amount by the end of the period equivalent to the sum of the annual charges which would have been assessed under a water supply contract, together with interest computed at the project interest rate which is assumed to be four percent per annum. The total estimated equivalent unit rate for service of annual entitlements to the district under these assumptions is \$14.32 per acre-foot at canalside as shown in Table 4.

#### Cost of Surplus Water

Article 21 of the standard provisions provides that if during any year the supply of project water, after appropriate allowance for holdover storage, exceeds the total of annual entitlements of all contractors for that year, the State shall offer to sell and deliver such surplus water for periods expiring not later than the end of such year. The article also provides that the charge for surplus water shall be at least equal to the variable operation, maintenance, and power costs incurred in service for such water. This would include variable charges for both the conservation and transportation facilities.

Under a modification of Article 21 in the contract negotiated with the district, surplus water would be allocable



to the district for agricultural and ground water replenishment use on the basis of the amount of entitlement water it so uses.<sup>2/</sup> Such surplus water would be furnished at prices which would return to the State the variable operation, maintenance, power, and replacement components of the Delta Water Charge and Transportation Charge incurred in the service of supplying such water. Contracts made pursuant to such modification of Article 21 may exceed one year in duration.

The unit rate for surplus water which could be supplied for agricultural and ground water replenishment use in Kings County is estimated to range from \$3 to \$4 per acre-foot. It is estimated that surplus water will be available to the district on an irrigation demand schedule through 1981. The equivalent unit rate for delivery of combined project water to meet annual entitlements and surplus water is about \$12.23 per acre-foot over the repayment period for the contracted annual entitlements shown in column 2 and the assumed deliveries of surplus water in column 3 of Table 6.

#### Surcharge

A surcharge equivalent to the power credit per acre-foot of water will be made for project water put to agricultural or manufacturing use on excess land. This surcharge is provided for in Article 30 of the standard contract provisions, and is

<sup>2/</sup> Article 45(a) of contract between Empire West Side Irrigation District and State dated December 30, 1963.

established at \$2 per acre-foot until all of the facilities for generation of electrical energy in connection with the operation of initial project conservation facilities are installed and in operation. Each year thereafter the State will redetermine the power credit per acre-foot of water. Excess land is defined as that part of any land in excess of 160 acres in single beneficial ownership, or 320 acres in joint ownership by husband and wife. The surcharge would be applicable to project water delivered under the district's annual entitlement and to surplus water.

#### Surcharge Credit

Under terms of San Joaquin Valley agricultural contracts, the State may allow a credit to the contractor not to exceed the surcharge to be paid by such contractor, which credit shall be utilized to reduce the cost of water for agricultural use on other than excess land at a uniform rate not to exceed \$2 per acre-foot.<sup>3/</sup>

#### Cost of Local Distribution

The present distribution system can be utilized by the district for distribution of project water to be delivered from the California Aqueduct.

A locally constructed and financed conveyance facility will be required to convey water from the California Aqueduct to the district's existing distribution system. The district lies to the east and at a lower elevation than the California Aqueduct.

<sup>3/</sup> Article 45(b) of contract between Empire West Side Irrigation District and the State dated December 30, 1963.

A preliminary design of a conveyance facility has been made for purposes of estimating costs. It has been assumed for the purposes of this report that the Empire West Side Irrigation District and the Tulare Lake Basin Water Storage District will build a joint-use conveyance facility, as shown on Plate 2, "Empire West Side Irrigation District," running due east from the California Aqueduct for about 12 miles to a point just north of Empire Weir No. 2 on the Kings River. Under this assumption the two districts would share in the cost of the system based on the ratio of the respective maximum annual entitlements of the districts. The conveyance facility was designed as a concrete-lined canal with a capacity of 165 second-feet. The facility will deliver the maximum annual entitlement of 36,000 acre-feet which includes the share for the Tulare Lake Basin Water Storage District.

The cost estimate for construction of the conveyance facility is based on unit cost data adjusted to reflect 1962 prices. The estimated Empire West Side Irrigation District's share of the capital cost for the conveyance facility is \$71,800. It has been assumed this capital cost would be repaid by the end of a 40-year period. From then on, the total annual cost would include only the operation, maintenance, and replacement charges. Table 6 (bound at end of report) shows the total annual local distribution and conveyance costs.

The above capital cost does not include the estimated capital cost for a turnout structure which must be paid to the State prior to its construction. The district's share of the capital cost of a turnout structure would be about \$9,900.

The total cost, including the capital cost of the conveyance facility and the operation, maintenance, and replacement charges of both the distribution system and the conveyance facility, on an equivalent unit rate basis, is \$2.74 per acre-foot over the 40-year repayment period or \$2.65 per acre-foot over the 68-year State Water Project repayment period. The latter amount consists of \$0.98 per acre-foot for repayment of the capital cost and \$1.67 per acre-foot for operation, maintenance, administration, and replacement costs.



## CHAPTER IV. DEMAND FOR PROJECT WATER

Presented in this chapter are the relevant economic factors and data used to determine project water demand, an estimate of the demand, and a determination of the buildup of demand in the Empire West Side Irrigation District. The purpose of studying these matters was to determine to what extent the farming of land in the district could support the purchase of the "potential requirement for imported water" which was developed in Chapter II.

### Payment Capacity of Crops

In this report, payment capacity is defined as the amount which is available from gross crop revenues to pay water costs after deducting all other farm production expenses. The appraisal of crop payment capacity per acre-foot of water involves the consideration of crop yields, prices received, crop production costs, and other factors related thereto. These factors are briefly discussed, and a payment capacity determination is presented, in the following paragraphs.

### Crop Yields

Crop yields used in this payment capacity analysis were developed following review of Kings County agricultural reports and conferences with local authorities. The adopted yields are believed to be conservative.

### Prices Received

The prices of farm products used in this analysis are essentially the averages of prices received by Kings County farmers during the 1952-56 period. This information was obtained from the Agricultural Commissioner's reports and conferences with local authorities.

### Crop Production Costs

Crop production costs are computed on a per acre basis, using the estimated average unit prices paid during the 1952-56 period for the factors of production, including interest, taxes, and wages. These unit prices are applied to all labor and materials, except water, used in production; cash overhead, such as taxes, repairs, and general expenses; all interest and depreciation; and management charges.

In addition to the foregoing, there is included in the crop production costs an allowance for occasional losses attributable to inclement weather and adverse market conditions.

### Payment Capacity Determination

Estimated crop production costs on a per acre basis, excluding cost of water, for each of the projected crops shown in Table 3 were deducted from the gross income values, derived from crop yields and prices received, to establish the payment capacity per acre of each crop. Payment capacities at the farm headgate for crops in the district are shown in Table 5, "Estimated Annual Payment Capacities and Water Demand Schedule for Empire West Side Irrigation District."

ESTIMATED ANNUAL PAYMENT CAPACITIES AND WATER DEMAND  
SCHEDULE FOR EMPIRE WEST SIDE IRRIGATION DISTRICT

Crop	Land Class:	:Projected Crop Acreage:			:Water Requirement:			:Cumulative	
		:in 1990 on Presently			:(In acre-:)			:Water	
		:Developed Land			:feet per: feet)			:Requirement	
		:(In acres)			:acre)			:(In acre-feet)	
Sugar beets	Excellent	380	2.7	1,000	\$	33.70		1,000	
Cotton	Excellent	530	3.8	2,000		33.40		3,000	
Miscellaneous field	Excellent	100	2.0	200		26.00		3,200	
Barley	Excellent	370	1.1	400		24.50		3,600	
Cotton	Medium	1,440	3.8	5,500		21.60		9,100	
Miscellaneous field	Medium	240	2.0	500		19.50		9,600	
Sugar beets	Medium	300	2.7	800		18.90		10,400	
Barley	Medium	1,680	1.1	1,900		16.40		12,300	
Alfalfa, seed	Excellent	130	3.2	400		12.80		12,700	
Cotton	Poor	150	3.8	600		12.10		13,300	
Alfalfa, seed	Medium	400	3.2	1,300		10.60		14,600	
Pasture	Medium	340	3.9	1,300		10.30		15,900	
Barley	Poor	420	1.1	500		10.00		16,400	
Pasture	Poor	340	3.9	1,300		5.40		17,700	
TOTALS		6,820		17,700					

Most of the data used in the payment capacity determination have been derived from the department's office report entitled "Supplement to Information and Data on Proposed Program for Financing and Constructing State Water Facilities" dated May 1960.

### Economic Demand for Water

In this report a water demand schedule is defined as a catalogue of quantities of water that will be purchased at various possible prices at a given time. Such a schedule indicates the relationship of demand for water to cost of water and is presented here in tabular form and as a water cost-demand curve.

A water demand schedule is based on the principle that as the price of water decreases the demand for water increases and, conversely, as the price increases the demand decreases. This difference in the demand occurs because different crops possess different abilities to pay for water, different lands have different abilities to grow crops, and operators with sunk investments vary from other operators in their willingness to pay for water. Some crops, such as deciduous fruit, grapes, miscellaneous truck, and cotton have greater abilities to pay for water than crops such as grain, alfalfa, and miscellaneous field crops. Farm operators will normally grow only those crops which, as a minimum, return all the variable costs of production. Consequently, with high-cost water only the crops with higher payment capacities would be grown, but with low-cost water a larger amount of water would be purchased to irrigate crops with both high and low payment capacities.

The payment capacities of the various crops tentatively projected on land of various classes have been arrayed by magnitude in Table 5. Values in this table were used to plot the curve shown on Plate 3, "Water Cost-Demand Curve for Empire West Side Irrigation District."

The weighted average unit cost of the present irrigation supply and the future supply of state water has been determined for the purpose of utilizing the water cost-demand curve. It has been assumed that ground water would cost \$10.75 per acre-foot, Kings River water would cost \$4.25 per acre-foot, and the district would charge \$17.86 per acre-foot for delivery of water from the State Water Project to farm headgates in 1990. The weighted average unit cost for 7,300 acre-feet of ground water, 5,500 acre-feet of Kings River water and 3,000 acre-feet from the California Aqueduct would be \$9.80 per acre-foot. With this water cost, the water cost-demand curve indicates there would be an economic demand for about 15,500 acre-feet of water annually.

The water cost-demand curve is based on a consideration of the payment capacity of each crop alone, with no allowance for averaging among crops. Theoretically, for a given cost of water only those crops would be utilized which have payment capacities greater than the cost of water. It is believed, however, that within a farm unit, there will be some averaging; that is, the owner will to some extent utilize the excess of payment capacity over cost of some crops to assist in the purchase of water for crops with payment capacities less than water costs. The growing of the latter crops would be desirable for crop rotation purposes.



For this reason, it is believed that the 1990 economic demand for water in the district will be approximately equal to the district's potential water requirement of 17,700 acre-feet annually. Since 12,800 acre-feet of the amount is expected to be supplied by ground water and Kings River water, the estimated economic demand for water from the State Water Project in the district is 4,900 acre-feet annually.

#### Water Demand Buildup

The district has requested the maximum annual entitlement in the initial year of delivery. It is believed that the district can utilize this water. The necessary distribution system for the district is already installed. The imported water will supplement that available from other sources in order to permit a more stable crop pattern. The amounts of surplus water assumed to be delivered on an irrigation demand schedule are shown in column 3 of Table 6.

## CHAPTER V. FINANCIAL FEASIBILITY

The previous chapter indicates there is an estimated economic demand for 4,900 acre-feet of state water in addition to the present supply of 12,800 acre-feet to irrigate land in the Empire West Side Irrigation District. As previously indicated, the district has contracted for a maximum annual entitlement of 3,000 acre-feet. Presented in this chapter is an analysis which demonstrates the feasibility of a plan for the repayment by the district of the long-term debt which must be undertaken in order to purchase water under the contract and deliver the water to the users' headgates.

Although the cost of the water to the district will be relatively high, it is shown in Table 6, "Financial Analysis, Empire West Side Irrigation District," that the district will not be unduly burdened by its debt incurred for purchase, conveyance, and distribution of water during the project repayment period.

The analysis indicates that the district can meet, on a year-to-year basis, the cost of project water and the cost to convey and distribute the water to the land. It is believed that the information presented herein justifies the contract between the State and the district for a supply of 3,000 acre-feet of water annually.

### Financial Analysis

The various factors entering into the financial analysis are discussed in the following paragraphs. The analysis is presented in Table 6 which appears at the end of the report.

## Water Toll

A water toll method of recovering water costs has been utilized in this analysis. Assumed district water tolls for annual entitlements and surplus water are shown in columns 5 and 7 of Table 6. During the period 1968 through 1988, a toll of \$14.00 per acre-foot has been assumed to recover all costs, including the cost of the turnout structure and measuring device, and to provide excess revenue to insure against deficit spending in 1972, when surplus water is not expected to be available. A toll of \$12.60 per acre-foot in 1989 allows total revenues to equal total costs by the end of 1989. For the remainder of the repayment period the assumed tolls will balance costs on a year-to-year basis. It will be noted in the analysis that no revenue from the sale of surplus water is assumed after 1981. Some surplus water would probably be available at off-peak times after that year, but it is assumed it would be sold at or near cost. Costs and tolls would therefore remain in balance.

## Assessed Valuation and Bonded Indebtedness

The assessed valuation of the district, including lands, improvements, and personal properties is \$539,860. The bonded indebtedness assignable to the district area was \$48,810. The bonded indebtedness is thus nine percent of the assessed valuation.

## Other Financial Obligations

The district recently entered into a contract with the United States Bureau of Reclamation for 13,000 acre-feet of storage in Pine Flat Reservoir. As an indication of the amount of repayment involved, the district's annual payment will be about \$4,600 under



a 40-year interest-free contract. The district will also have to pay about \$900 a year for Pine Flat operation and maintenance.

#### Financial Analysis Table

Presented in Table 6 is a year-by-year summary of the assumed revenues from sale of water by the district; the costs which would be charged to the district by the State for annual entitlements and surplus water; the costs which would be incurred by the district for conveyance and distribution of state water; the difference between revenues and costs or the net operating revenues; and the calculation of balance of funds remaining at the end of the year.

The capital cost for the turnout structure and measuring device from the California Aqueduct must be paid prior to the start of construction. It is estimated that the district's share of the cost of a joint turnout structure will be \$9,900, which will be due in 1966. In this analysis, it has been assumed that the district would pay this cost in a lump sum financed from a short-term loan.

During the early years of the project, substantial amounts of revenue in excess of the cost are generated. These excess revenues accumulate in 1981 to a maximum of \$96,000, including interest at four percent. Thereafter, the year-end balance is reduced to zero by 1989 and remains so throughout the repayment period.

Although the net revenues are assumed to accumulate interest during the early years of the project, these funds could be used to finance partially the construction of the conveyance facility and/or make advance payments to the State. The latter would be

equivalent to investment of the net revenues at four percent if the project interest rate, which is dependent upon the interest rate on bonds sold by the State, averages four percent as was assumed in making the estimates of water cost.

The financial analysis contains many assumptions as to matters which are in the province of the Board of Directors of the Empire West Side Irrigation District. It is believed, however, that the assumptions employed herein are sufficiently representative to demonstrate that not only is the suggested program financially feasible, but that it would remain so with reasonable variation in the assumptions.

An explanation of the column headings of the financial analysis table follows:

Explanation of Column Headings in Table 6

Column  
Number

Explanation

- |   |                                                                                                                                                                                                                                                    |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Years of the period of analysis commencing in year 1966, the year in which payment for the turnout structure is assumed to be made, and terminating in 2035, the assumed end of the 50-year repayment period following final project construction. |
| 2 | Delivery of annual entitlement water. The total demand is that which was requested by the district and which appears in Table A of the contract between the district and the State.                                                                |

Explanation of Column Headings in Table 6 (Continued)

<u>Column Number</u>	<u>Explanation</u>
3	Annual delivery of surplus water on an irrigation demand schedule. Its use terminates after 1981, the estimated last year of availability of such surplus water.
4	Total annual delivery to the district. (Sum of columns 2 and 3.)
5	Assumed tolls for entitlement water to all users in the district at farm headgate.
6	Total revenue from delivery of annual entitlements of water. (Product of columns 2 and 5.)
7	Assumed tolls for surplus water to all users in the district at farm headgate.
8	Total annual revenue from delivery of surplus water on an irrigation demand schedule. (Product of columns 3 and 7.)
9	Total annual revenue from delivery of both types of water. (Sum of columns 6 and 8.)
10	Annual repayment requirements for annual entitlements delivered at canalside to be paid to the State on a unit rate basis allowed under provisions of Article 45 of the Metropolitan Water District prototype contract.

Explanation of Column Headings in Table 6 (Continued)

<u>Column Number</u>	<u>Explanation</u>
11	Cost per acre-foot of delivering surplus water at canalside on an irrigation demand schedule.
12	Total annual cost of delivering surplus water at canalside on an irrigation demand schedule. (Product of columns 3 and 11.)
13	Total annual cost of delivering both types of water at canalside. (Sum of columns 10 and 12.)
14	Total annual local conveyance and distribution costs based on a 40-year repayment period at five percent interest.
15	Total annual cost of delivering both types of water to the farm headgate. (Sum of columns 13 and 14.)
16	Difference between cost of delivering both types of water to the farm headgate and estimated revenue received by the district from the sale thereof. (Column 9 less column 15.)
17	Balance of available funds from previous year plus net operating revenue collected in current year. (Sum of column 19 of previous year and column 16 of current year.)

Explanation of Column Headings in Table 6 (Continued)

<u>Column Number</u>	<u>Explanation</u>
18	Interest earning on balance of district funds. (Product of 0.04 and column 17.)
19	Balance of funds available to district at end of each year. (Sum of columns 17 and 18.)





## CHAPTER VI. SUMMARY AND CONCLUSIONS

The pertinent information presented in this report is summarized and conclusions are presented in the following sections.

### Summary

1. The Empire West Side Irrigation District, comprising 7,711 acres in Kings County, was organized in 1931. It may contract with the State for a water supply, construct and operate conveyance and distribution facilities to deliver said supply, and obtain funds by water charges and by ad valorem assessments of land.

2. The economy of the district is based primarily on irrigated agriculture. In 1962 about 6,600 gross acres were irrigated.

3. The California Water Commission, as of December 1963, allocated 1,547,000 acre-feet of water from the State Water Project to the San Joaquin Valley, including 72,000 acre-feet reserved for the valley from other allocations if needed. At the time final negotiations of a water supply contract between the State and the district were in progress in December 1963, 1,000,000 acre-feet of this total had been contracted for, and other contracts for about 214,500 acre-feet were under negotiation. Thus ample water for annual entitlements was available for contracting with the district.

4. There is an estimated potential water requirement of about 17,700 acre-feet annually in the district. The determination of this quantity is based on the consideration of agri-

cultural water demand factors but disregards the availability and cost of water.

5. The present water supply for irrigation of land in the district is water from the Kings River and ground water pumped from private wells in the district. This supply is estimated to be 12,800 acre-feet annually.

6. The potential requirement for imported water in the district is equal to the difference between the total potential requirement and the local supply, approximately 4,900 acre-feet.

7. Water from the California Aqueduct can be provided to the district at an estimated equivalent unit rate for annual entitlements of \$14.32 per acre-foot at canalside. The unit rate for surplus water used for agricultural purposes in Kings County is estimated to range from \$3 to \$4 per acre-foot. The equivalent unit rate for delivery of combined entitlement and surplus water is about \$12.23 per acre-foot over the repayment period.

8. The district has a distribution system which can be used to distribute water from the California Aqueduct, and is considering the joint use of a conveyance facility with Tulare Lake Basin Water Storage District to convey water from the aqueduct to the system. The estimated total cost to convey and distribute water, including the capital cost of the joint-use conveyance facility and the operation, maintenance, and replacement charges of both the distribution system and the conveyance facility, on an equivalent unit rate basis, is \$2.65 per acre-foot over the repayment period.

9. Consideration of the payment capacity of crops and the cost for purchase, conveyance, and distribution of water, indicates that the economic demand in 1990 in the district will approximately equal the district's potential water requirement of 17,700 acre-feet per year. The economic demand could be supplied as follows: 5,500 acre-feet from the Kings River, 7,300 acre-feet from ground water, and the remainder of 4,900 acre-feet from the State Water Project by contract with the State. The district contracted on December 30, 1963 for a water supply of 3,000 acre-feet annually from the State Water Project.

10. The present assessed valuation of the district is about \$539,860 which includes lands, improvements, and personal properties. The bonded indebtedness assignable to the district's area is \$48,810 or nine percent of the assessed valuation.

11. The district will not be unduly burdened by its debt incurred for purchase and distribution of water under the state contract during the project repayment period.

### Conclusions

1. The State of California has the necessary water supply and the authority to enter into the contract with the Empire West Side Irrigation District, which was signed December 30, 1963, for the service of a maximum annual entitlement of 3,000 acre-feet of water, and which includes an option to increase the amount of the contract by the district's share of the project yield uncontracted on December 31, 1963.

2. The contractual cost to the district and the cost for conveyance and distribution of the water can be met with

agricultural water tolls which would not exceed the ability of users to pay for water.

3. The Empire West Side Irrigation District has the authority, the necessity, and the financial capability to enter into a contract with the State of California for the service of a maximum annual entitlement of 3,000 acre-feet of water from the State Water Project.

		: Previous Year:		
Cost:	Net	: Balance Plus	: Interest	: Balance
arm :	Operating:	Net Operating:	at	: at End
ate :	Revenue :	Revenue :	4%	: of Year
15	9-15=16	17	18	17+18=19
		\$-9,900*		
00	\$ -300	-300	\$ -400	\$-10,600
00	12,000	1,400	100	1,500
00	8,400	9,900	400	10,300
00	900	11,200	400	11,600
00	3,800	15,400	600	16,000
00	-7,400	8,600	300	8,900
00	11,600	20,500	800	21,300
00	11,500	32,800	1,300	34,100
00	11,100	45,200	1,800	47,000
00	10,700	57,700	2,300	60,000
00	9,400	69,400	2,800	72,200
00	4,400	76,600	3,100	79,700
00	4,600	84,300	3,400	87,700
00	3,800	91,500	3,700	95,200
00	-2,900	92,300	3,700	96,000
00	-14,300	81,700	3,300	85,000
00	-14,300	70,700	2,800	73,500
00	-14,300	59,200	2,400	61,600
00	-14,300	47,300	1,900	49,200
00	-12,200	37,000	1,500	38,500
00	-12,200	26,300	1,100	27,400
00	-11,900	15,500	600	16,100
00	-16,100	0	0	0
00	0	0	0	0
00	0	0	0	0



TABLE 6  
FINANCIAL ANALYSIS  
EMPIRE WEST SIDE IRRIGATION DISTRICT

Year	Annual Water Deliveries :				Annual Revenues :				Annual Costs at Canalside :				Total Annual :		Previous Year :			
	(In acre-feet) :				Entitlement :				Entitlement :				Local Distri-:		Total Cost: Net : Balance Plus : Interest :			
	:				Per :				Per :				bution & Con-:		at Farm : Operating:Net Operating: at :			
	Entitlement:	Surplus:	Total:	Acre-foot:	Total	Acre-foot:	Total	Total	Total	Acre-foot:	Total	Total	veyance Costs:	Headgate	Revenue	Revenue	4%	of Year
1	2	3	2+3=4	5	2x5=6	7	3x7=8	6+8=9	10	11	3x11=12	13	14	13+14=15	9-15=16	17	18	17+18=19
1966																\$-9,900*		
67									\$ 300			\$ 300		\$ 300	\$ -300	-300	\$ -400	\$-10,600
68	3,000	1,900	4,900	\$14.00	\$42,000	\$14.00	\$26,600	\$68,600	39,000	\$3.02	\$5,700	44,700	\$11,900	56,600	12,000	1,400	100	1,500
69	3,000	1,400	4,400	14.00	42,000	14.00	19,600	61,600	36,600	3.76	5,300	41,900	11,300	53,200	8,400	9,900	400	10,300
1970	3,000	1,100	4,100	14.00	42,000	14.00	15,400	57,400	41,400	3.80	4,200	45,600	10,900	56,500	900	11,200	400	11,600
71	3,000	1,200	4,200	14.00	42,000	14.00	16,800	58,800	39,300	3.86	4,600	43,900	11,100	55,000	3,800	15,400	600	16,000
72	3,000	0	3,000	14.00	42,000	14.00	0	42,000	39,900	--	--	39,900	9,500	49,400	-7,400	8,600	300	8,900
73	3,000	1,900	4,900	14.00	42,000	14.00	26,600	68,600	39,600	2.90	5,500	45,100	11,900	57,000	11,600	20,500	800	21,300
74	3,000	1,900	4,900	14.00	42,000	14.00	26,600	68,600	39,600	2.94	5,600	45,200	11,900	57,100	11,500	32,800	1,300	34,100
1975	3,000	1,900	4,900	14.00	42,000	14.00	26,600	68,600	39,600	3.17	6,000	45,600	11,900	57,500	11,100	45,200	1,800	47,000
76	3,000	1,900	4,900	14.00	42,000	14.00	26,600	68,600	40,200	3.05	5,800	46,000	11,900	57,900	10,700	57,700	2,300	60,000
77	3,000	1,800	4,800	14.00	42,000	14.00	25,200	67,200	40,200	3.21	5,800	46,000	11,800	57,800	9,400	69,400	2,800	72,200
78	3,000	1,900	4,900	14.00	42,000	14.00	26,600	68,600	45,900	3.37	6,400	52,300	11,900	64,200	4,400	76,600	3,100	79,700
79	3,000	1,900	4,900	14.00	42,000	14.00	26,600	68,600	45,900	3.27	6,200	52,100	11,900	64,000	4,600	84,300	3,400	87,700
1980	3,000	1,900	4,900	14.00	42,000	14.00	26,600	68,600	46,500	3.35	6,400	52,900	11,900	64,800	3,800	91,500	3,700	95,200
81	3,000	1,200	4,200	14.00	42,000	14.00	16,800	58,800	46,500	3.43	4,100	50,600	11,100	61,700	-2,900	92,300	3,700	96,000
82	3,000		3,000	14.00	42,000			42,000	46,800			46,800	9,500	56,300	-14,300	81,700	3,300	85,000
83	3,000		3,000	14.00	42,000			42,000	46,800			46,800	9,500	56,300	-14,300	70,700	2,800	73,500
84	3,000		3,000	14.00	42,000			42,000	46,800			46,800	9,500	56,300	-14,300	59,200	2,400	61,600
1985	3,000		3,000	14.00	42,000			42,000	46,800			46,800	9,500	56,300	-14,300	47,300	1,900	49,200
86	3,000		3,000	14.00	42,000			42,000	44,700			44,700	9,500	54,200	-12,200	37,000	1,500	38,500
87	3,000		3,000	14.00	42,000			42,000	44,700			44,700	9,500	54,200	-12,200	26,300	1,100	27,400
88	3,000		3,000	14.00	42,000			42,000	44,400			44,400	9,500	53,900	-11,900	15,500	600	16,100
89	3,000		3,000	12.60	37,800			37,800	44,400			44,400	9,500	53,900	-16,100	0	0	0
1990-2007	3,000		3,000	17.86	53,600			53,600	44,100			44,100	9,500	53,600	0	0	0	0
2008-2035	3,000		3,000	16.47	49,400			49,400	44,100			44,100	5,300	49,400	0	0	0	0

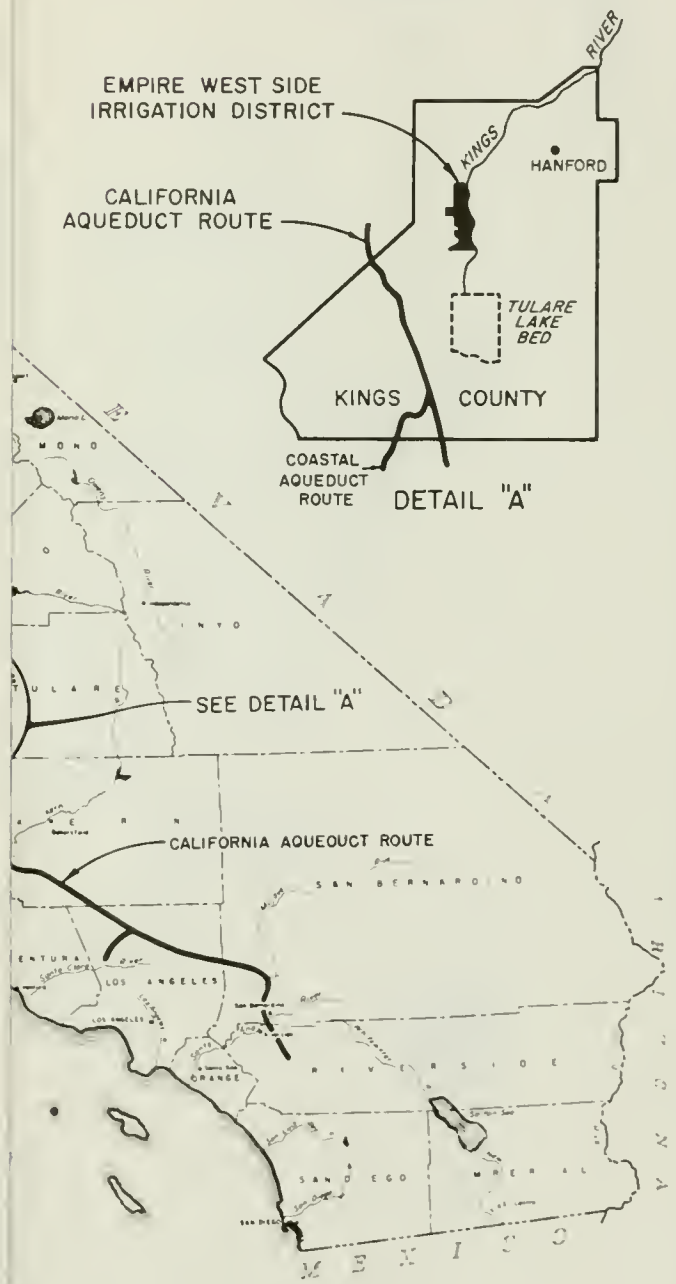
\* Lump sum for turnout structure.



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FEASIBILITY OF SERVING THE EMPIRE WEST SIDE  
IRRIGATION DISTRICT FROM THE STATE WATER PROJECT

LOCATION OF  
EMPIRE WEST SIDE IRRIGATION DISTRICT

SCALE OF MILES  
30 0 30 60 90

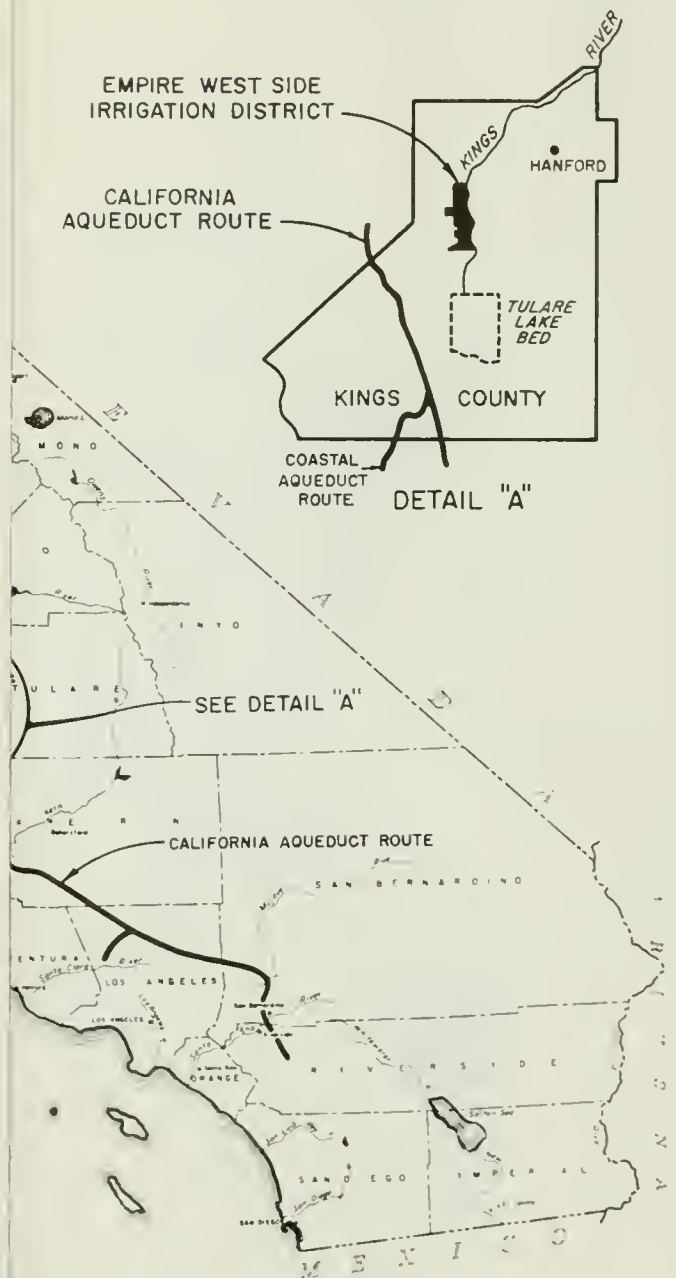




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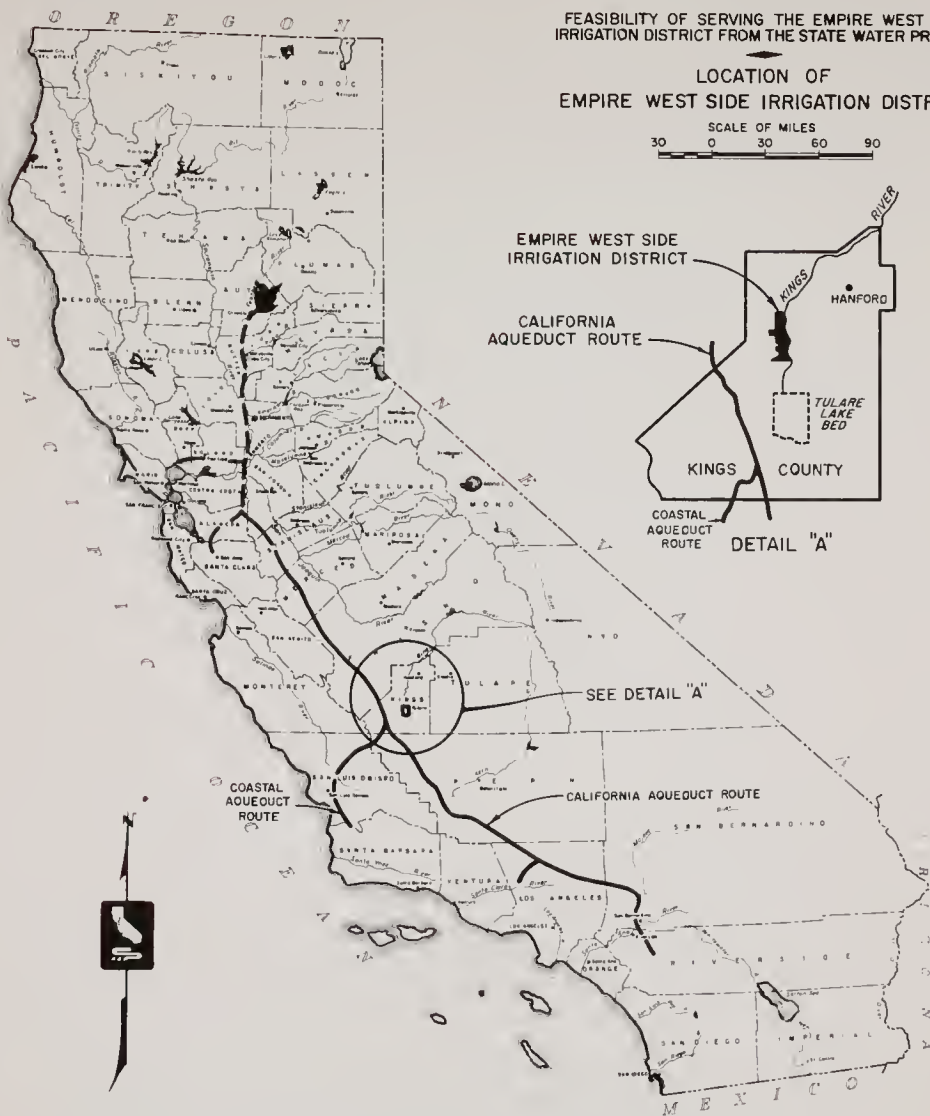


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## LEGEND

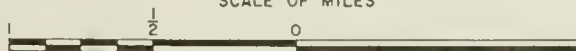
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FEASIBILITY OF SERVING THE EMPIRE WEST SIDE  
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EMPIRE WEST SIDE IRRIGATION DISTRICT  
1964

SCALE OF MILES





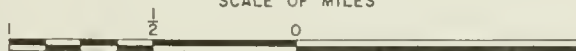


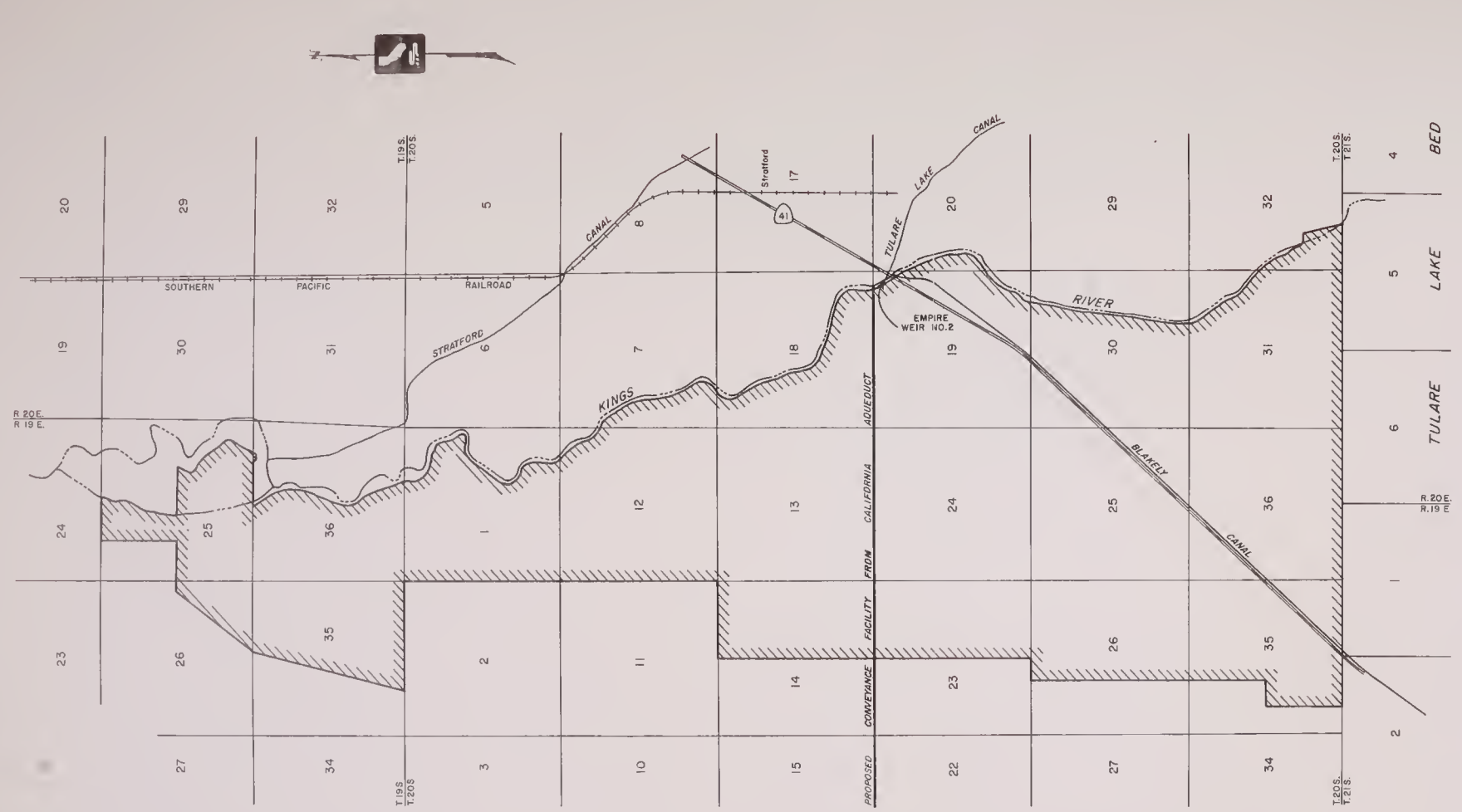
## LEGEND

 EMPIRE WEST SIDE IRRIGATION DISTRICT  
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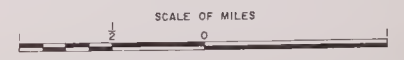


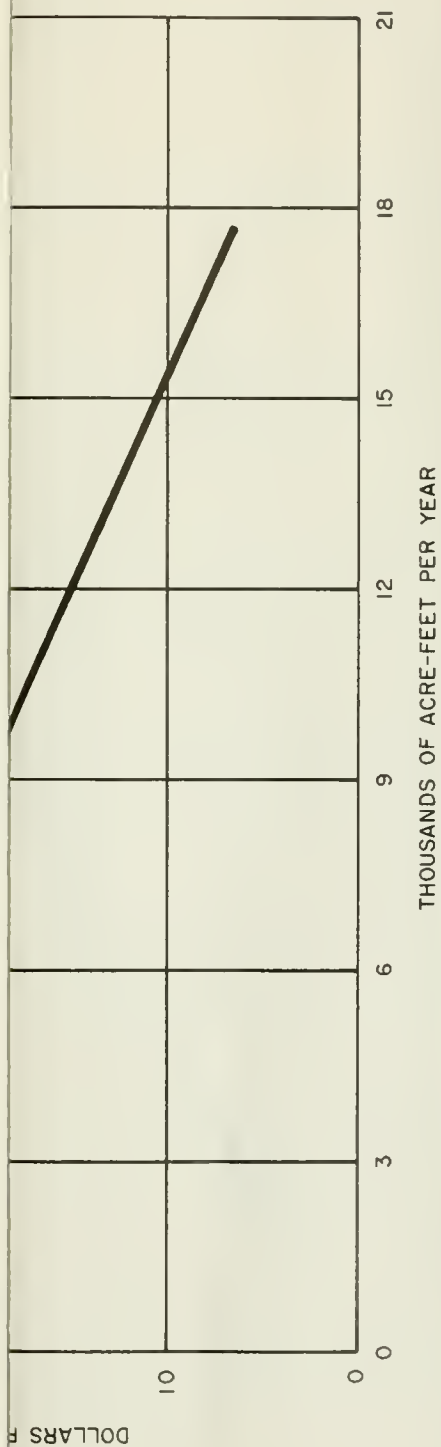


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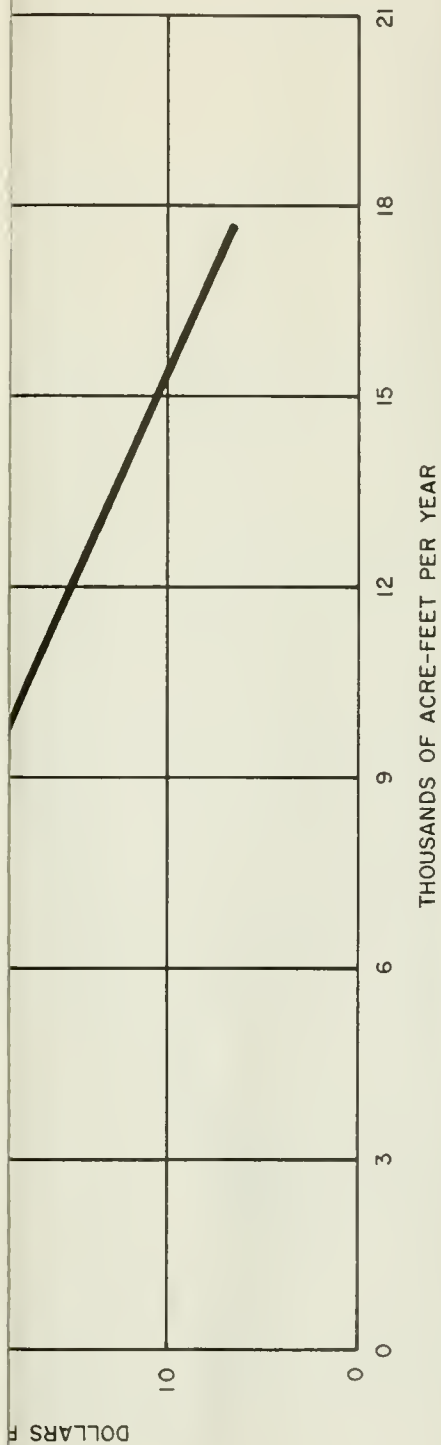
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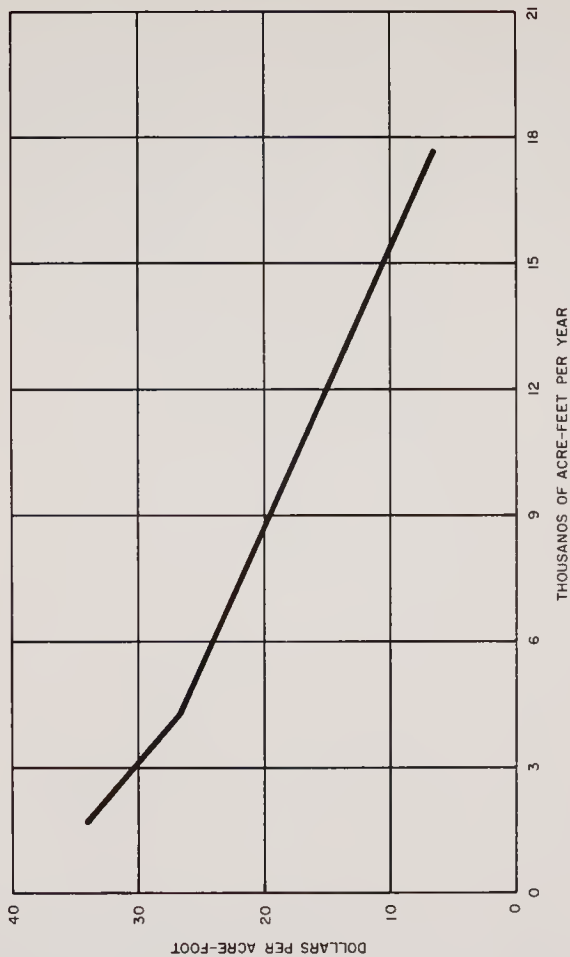


**WATER COST-DEMAND CURVE  
FOR  
EMPIRE WEST SIDE IRRIGATION DISTRICT**





**WATER COST-DEMAND CURVE  
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